Final Report for Period: 06/2007 - 05/2008
Submitted on: 11/01/2008
Principal Investigator: Balch, Tucker .
Award ID: 0731741
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Submitted By:
Balch, Tucker - Principal Investigator
Title:
2007 RoboCup International Symposium

Project Participants

Senior Personnel

Name: Balch, Tucker
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Dellaert, Frank
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Visser, Ubbo
Worked for more than 160 Hours: No
Contribution to Project:
Symposium Co-Chair

Name: Ribeiro, Fernando
Worked for more than 160 Hours: No
Contribution to Project:
Symposium Co-Chair

Name: Ohashi, Takeshi
Worked for more than 160 Hours: No
Contribution to Project:
Symposium Co-Chair

Post-doc

Graduate Student

Undergraduate Student

Technician, Programmer

Other Participant

Research Experience for Undergraduates

Organizational Partners

RoboCup Federation
The RoboCup Federation provided website resources an personnel to help with registration.

Other Collaborators or Contacts

Activities and Findings

Research and Education Activities:

We held an international symposium involving hundreds of participants from 42 countries. The symposium was held in conjunction with RoboCup Atlanta 2007, July 9-10, 2007.

Findings:

The Symposium is presented annually, and it represents a sort of report on the 'state of the art' on adversarial multi-robot systems. Overall there are several subfields for which we can provide a status report:

o Legged robot mechanical systems

The field suffered a major setback when SONY chose to withdraw the AIBO robot from production. However, RoboCup has moved forward to bipedal robots (vs the 4-legged AIBO). We are still at the state in these leagues where the focus is on robust motion -- the robots are not yet able to coordinate effectively as a team. We have seen significant engineering progress here, but the field is not yet reporting significant scientific progress.

o Wheeled robot mechanical systems

The situation is different in wheeled leagues. We have seen several years now where the top performing teams use the same mechanical platforms from year to year. The solid mechanical platforms enable the researchers in these leagues to progress scientifically. In particular, we saw very nice progress in real robot teamwork and perception.

o Autonomous perception

Localization seems now to be a solved problem in RoboCup. Ball tracking and opponent finding solutions are robust when targets are identified with colors (even in as-is lighting conditions). Next challenges will involve relaxing the requirements for targets to be color-coded, and also with a move to outdoor scenarios.

There are also new and interesting probabilistic perception methods, especially for moving targets, and for joint observation and tracking.

o Team planning & strategy

This is where we are seeing now significant progress. Researchers have demonstrated joint learning in real time on multiple robots (in previous years it was not possible for useful learning to occur on the robots).

There are also new algorithms for joint / team planning and decision making using probabilistic methods.

Training and Development:

We had a very effective poster session with strong participation by the attendees with participation by about 30 presenters. Junior researchers especially were encouraged to present their work to the community. They were provided an educational experience through these conversations.

Outreach Activities:

Our event included participants from 42 countries. We were especially pleased with the opportunity to share ideas with faculty and students from locations as remote as China and Iran.

At RoboCup overall, there was an especially strong contingent of international K-12 participants. All together, there were about 800 students and teachers from primary and secondary educational institutions around the world. These participants were encouraged to attend the Symposium as well. About 50 did.

Journal Publications

Books or Other One-time Publications

Visser, Ribeiro, Ohashi, Dellaert, "RoboCup 2007: Robot Soccer World Cup XI (Lecture Notes in Computer Science)", (2007). Book, Published
Editor(s): Visser, Ribeiro, Ohashi, Dellaert
Bibliography: published by Springer.

Web/Internet Site

URL(s):

http://www.tzi.de/~visser/rc07/

Description:

This was the main site for the symposium.

Other Specific Products

Contributions

Contributions within Discipline:

The Symposium represents the core meeting for the presentation and discussion of scientific contributions in diverse areas related to the three main threads within RoboCup: RoboCupSoccer, RoboCupRescue and RoboCupJunior. Its scope encompasses, but is not restricted to, research and education activities within the fields of Artificial Intelligence and Robotics.

Due to its interdisciplinary nature and the exploration of various and intimate connections of theory and practice across a wide spectrum of different fields, the symposium offers an excellent opportunity to introduce new techniques to various scientific disciplines. The experimental, interactive and benchmark character of the RoboCup initiative creates the opportunity to present, learn and evaluate novel ideas and approaches with significant potential. If promising, they are then rapidly adopted and

field-tested by a large (and still strongly growing) community. In particular, we would like to urge also people not actively participating in a RoboCup team to submit their work. The introduction of RoboCup@Home in 2006 provides additional opportunity to expand the areas of discussion at the Symposium.

Contributions to Other Disciplines:

RoboCup is quite interdisciplinary. It includes, at least: computer vision, AI, multi-agent planning, mechanical design, and control theory, to name a few.

Even so, our most substantial recent contribution outside these areas includes CS education, and CS education research, which is advanced through RoboCup Junior.

Contributions to Human Resource Development:

Our most effective claim in this area is that 10 to 20 students, in primary and secondary school attended our symposium. Our hope, of course, is that they were impressed, and would want to continue in a scientific career.

Contributions to Resources for Research and Education:

Contributions Beyond Science and Engineering:

Categories for which nothing is reported:

Any Journal

Any Product

Contributions: To Any Resources for Research and Education

Contributions: To Any Beyond Science and Engineering